

INDEX.

- Adair county, articles on, 214.
 Adams county, articles on, 214.
 Administrative Reports, 1.
 Age of lava flow, 169.
 Allamakee county, articles on, 215.
 Lime, 24.
 Oneota limestone, quarried, 24.
 Trenton limestone, 26.
 Saltpetre, 192.
 St. Croix sandstone, 20.
 Altitudes, articles on, 215.
 Alluvium, 138.
 Alum, 195.
 Aluminum, articles on, 215.
 Ancient Lava Flows in Northwestern Iowa, 163.
 Anglesite, 194.
 Annotated Catalogue of Minerals, 181.
 Appanoose county, articles on, 216.
 Aragonite, 193.
 Arrangement of coal beds, 112.
 Artesian wells, articles on, 216.
 Assistants, local work of, 4.
 Asteroids, articles on, 216.
 Audubon county, articles on, 217.
 Augusta formation, 67.
 Augusta limestone, 59.
 Uses, 71.
 Typical section, 61.
 Aux Vases sandstone, 75.
 Bain, Harry Foster, Distribution and Relation of Saint Louis Limestone in Mahaska county, Iowa, 171.
 Barbour, E. H., writings, 217.
 Barris, W. H., writings, 217.
 Barytes, 194.
 Articles on, 218.
 Beachler, Charles S., writings, 218.
 Bennington section, 96, 103.
 Benton county, articles on, 218.
 Beyer, Samuel W., Lava Flows, 163.
 Work of, 4.
 Bibliography, Iowa Geology, 209.
 Bierbauer, Bruno, writings, 219.
 Big Sioux section, 127, 155.
 Binks, Thomas, writings, 219.
 Black Hawk county, articles on, 219.
 Blastoids, articles on, 219.
 "Bluffs" in Mahaska county, 177.
 Boone county, articles on, 220.
 Brachiopods, articles on, 221.
 Bremer county, articles on, 224.
 Barytes, 194.
 Brick, articles on, 224.
 From Kinderhook clays, 57.
 Brick clays, Coal Measures, 123.
 Floyd county, 46.
 Paving, 155.
 Woodbury county, 152.
 Bryozoans, articles on, 224.
 Buchanan county, articles on, 224.
 Independence shales, 32.
 Quarries, 31.
 Buena Vista county, articles on, 224.
 Buhlman glass sand pits, Clayton county, 25.
 Building stones, articles on, 225.
 Coal Measures, 122.
 Fort Dodge, 137.
 Niagara, 197.
 Redrock Sandstone, 89, 101.
 Woodbury county, 138, 158.
 Burlington-Keokuk section, 58.
 Burlington Limestone, articles on, 225.
 Calamine, 195.
 Calciferous sandstone, articles on, 230.
 Calcite, 192.
 Articles on, 230.
 Calhoun county, articles on, 230.
 Call, R. E., writings, 230.
 Calvin, Samuel, Cretaceous Deposits of Woodbury and Plymouth counties, 145.
 Writings, 232.
 Cambrian, 20.
 Articles on, 235.
 Capellini, J., writings, 235.
 Carbonates, 192.
 Carboniferous, 47.
 General section, 117.
 Lower, articles on, 236.
 Classification, 50.
 Four groups of, 79.
 Life, 63.
 Present classification, 78.
 Shore-line changes, 119.
 Upper, 80.
 Articles on, 245.
 Carroll county, articles on, 251.
 Cascade, opposite page 61.
 Cass county, articles on, 251.
 Quarries, 135.
 Catalogue of Minerals, 181.
 Caverns, articles on, 251.
 Cedar county, articles on, 251.
 Building stones, 199.
 Lime, 201.
 Quarries, 31.
 Cedar Valley limestone, 34.
 Articles on, 252.

- Celestite, 194.
 Articles on, 252.
 Cephalopods, articles on, 252.
 Cerro Gordo county, articles on, 253.
 Cerussite, 193.
 Chalcedony, 191.
 Chalcopyrite, 191.
 Chalk, Niobrara, 138.
 Chamberlin, T. C., writings, 253.
 Changes of Carboniferous shore-line, 119.
 Channels, preglacial, in coal, 113.
 Chemung group, articles on, 254.
 Cherokee county, articles on, 254.
 Chester beds, articles on, 74.
 Use of term, 77.
 Chickasaw county, articles on, 254.
 Chouteau limestone, 56.
 Cincinnati group, articles on, 254.
 Clarke county, articles on, 255.
 Classification, Coal Measures, 83.
 Cretaceous deposits, 148.
 Lower Carboniferous, 50, 78.
 Clay, articles on, 255.
 Brick, Floyd county, 46.
 Brick, Kinderhook, 57.
 Brick, Woodbury county, 152.
 Coal Measures, 123.
 Shales of Coal Measures, 87.
 Upper Coal Measures, 114.
 Work done on, 8.
 Clay county, articles on, 255.
 Cretaceous deposits, 125.
 Clayton county, articles on, 255.
 Glass-sand, 25.
 Lime, 24.
 Onecota limestone, quarried, 24.
 Pictured rocks, 25.
 Quarries, 31.
 Trenton limestone, 26.
 Climate, articles on, 255.
 Clinton county, articles on, 256.
 Building stones, 199.
 Lime, 201.
 Quarries, 31.
 Clinton group, articles on, 256.
 Coal, 196.
 Amount produced, 122.
 Articles on, 256.
 Industry, extent, 122.
 Investigations, 7.
 Lithology, 92.
 Mines, number, 122.
 Operators, number, 122.
 Outliers, 81.
 Preglacial channels, 113.
 Upper Coal Measures, 115.
 Value, 122.
 Coal beds, basal, 111.
 Diagram of arrangement, 112.
 Distribution, 81.
 Extent and character, 110.
 Interrupted continuity, 112.
 Lenticular character, 112.
 Mahaska county, 178.
 Number, 110.
 Coal Field, eastern margin, 173.
 Interior, map opposite page 81.
 Coal Measures, 80.
 Building stones, 122.
 Classification, early, 83.
 Central Iowa section, opposite page 93.
 Clay shales, 87.
 Comparative section, 105.
 Des Moines beds, 85.
 Extent and character of coal beds, 110.
 Irregularity of floor, 121.
 Jackson county, 81.
 Kind of rocks, 84.
 Sandstone, 88.
 Sandstone at Des Moines, 91.
 Section showing arrangement, 112.
 Section showing relations of Upper and Lower, 118.
 Subdivisions, 83.
 Thickness, 83.
 Unconformities, 108.
 Unconformable on St. Louis limestone, 107.
 Coal Measures (Lower), 86.
 Articles on, 256.
 Limestone, 92.
 Stratigraphy, 93.
 Structure, 93, 116.
 Thickness, 109.
 Coal Measures (Middle), articles on, 261.
 Coal Measures (Upper), 114.
 Articles on, 261.
 Coal, 115.
 Limestone, 114.
 Lithology, 114.
 Sandstone, 115.
 Shales, 114.
 Stratigraphy, 115.
 Variability of strata, 107.
 Coalport Section (Marion county), 95.
 Coal region, 83.
 Drainage, 83.
 Topography, 82.
 Coelenterates, articles on, 263.
 Commerce section, 97.
 Composite section of Coal Measures, 105.
 Concretionary limestone, articles on, 263.
 Cone-in-Cone, articles on, 264.
 Continuity of coal beds, interrupted, 112.
 Copper, articles on, 264.
 Native, 185.
 Copperas, 195.

- Corals, articles on, 264.
 Corniferous, articles on, 266.
 Correlation, Cretaceous, 131.
 Devonian, 37.
 Crawford county, articles on, 266.
 Cretaceous, 123.
 Articles on, 270.
 Beds, correlation of, 131.
 Classification, 148.
 Deposit at Sioux City, 129.
 Deposits of Woodbury and Plymouth Counties, 145.
 Economic uses, 145.
 Fuel, 156.
 Outliers, 125.
 White's section of Iowa, 124.
 Crinoids, articles on, 266.
 Burlington, 65.
 Comparisons of, 65.
 Crustacea, articles on, 272.
 Crystalline rocks, 15.
 Culver, G. E., discovery of diabase, 16.
 Dakota, South, Sioux quartzite, 15.
 Dallas county, articles on, 273.
 Dakota section, 98.
 Section at Van Meter, 98.
 Dana, E. S., writings, 273.
 Dana, J. D., writings, 273.
 Davis county, articles on, 273.
 Day, David T., writings, 274.
 Day, William C., writings, 274.
 Delaware county, articles on, 274.
 Quarries, 31.
 Des Moines county, articles on, 279.
 Hannible shales, 55.
 Pyrite, 188.
 Quarries, 71.
 Gold, 185.
 Des Moines formation, 85.
 Des Moines section, 97.
 De Soto section, 98.
 Devonian, 32.
 Articles on, 282.
 Correlation, 37.
 Limestones, 34.
 Rocks, uses, 39.
 Diabase, near Iowa line, 16.
 Dickerson county, articles on, 286.
 Dickinson, W. H., writings, 286.
 Dip of Coal Measures, 109.
 Distribution of St. Louis limestone, 171.
 Dolomite, 193.
 Galena in, 26.
 Lime burning, 197.
 Drainage, articles on, 286.
 Coal region, 82.
 Drift, 138.
 Articles on, 287.
 Cretaceous fossils in, 125.
 Sheets, two, 141.
 "Drybone", 193.
 Dubuque county, 186.
 Anglesite, 194.
 Aragonite, 193.
 Calamine, 195.
 Calcite, 192.
 Cerussite, 193.
 Galena limestone, 26.
 Lead, 191.
 Maquoketa shales, 28.
 Pyrite, 189.
 Quarries, 31, 28.
 Smithsonite, 193.
 Sphalerite, 186.
 Trenton limestone, 26.
 Dunreath section, 96.
 Early mining in Iowa, 183.
 Echinoderms, articles on, 292.
 Echinoids, articles on, 294.
 Elements, 184.
 Elevations in coal region, 82.
 Elk cliff rocks, 99.
 Section, plate vii, fig. 2, opposite page 95.
 Emery, Rush, writings, 295.
 Emmet county, articles on, 295.
 Epsomite, 195.
 Articles on, 295.
 Extent and character of coal beds, 110.
 Extent of coal industry, 122.
 Farnsworth, J. P., writings, 296.
 Fayette county, articles on, 295.
 Gold, 186.
 Trenton limestone, 26.
 Faults in coal, 114.
 Ferns, Coal Measures, 88.
 Field work, C. R. Keyes, 7.
 Fire-clay, articles on, 297.
 Fishes, articles on, 297.
 Cretaceous, 156.
 Floyd county, articles on, 297.
 Brick clays, 46.
 Shales, 46.
 Ford section, 97.
 Formations, Geological, of Iowa, 11.
 Fort Benton clay, 156.
 Fort Dodge beds, 135.
 Fossils, articles on, 298.
 Cretaceous in drift, 125.
 Independence shale, 34.
 Franklin county, articles on, 305.
 Fremont county, articles on, 306.
 Fuels, articles on, 306.
 Galena limestone, 26.
 Articles on, 306.
 Galenite, 190.
 Gannet, Henry, writings, 307.
 Gas (Natural), articles on, 307.

- Gass, J., writings, 307.
 Gasteropods, articles on, 307.
 Geological Formations of Iowa, 11.
 Geological maps, list, 311.
 Geologist, Assistant State, work of, referred to, 4.
 Geologist, State, work of, 4.
 Geology, Bibliography, 209.
 Gildroy, James, writings, 312.
 Glacial deposits, 138.
 Glacial phenomena, articles on, 313.
 Glass sand, Allamakee county, 20.
 Chemical analysis, 25.
 Clayton county, 25.
 Gold, 185.
 Articles on, 313.
 Gordon, C. H., writings, 313.
 "Granite," Sioux, in Lyon county, 19.
 In Woodbury county, 138.
 Gravel, articles on, 314.
 Greene county, article on, 314.
 Gurley, W. F. E., writings, 314.
 Guthrie county, articles on, 314.
 Gypsum, 194.
 Articles on, 315.
 Beds, 135.
 In Coal Measure shales, 88.
 Work on, 8.
 Hackberry shales, articles on, 315.
 Hall, C. W., writings, 315.
 Hall, James, writings, 315.
 Hamilton county, articles on, 321.
 Hamilton formation, articles on, 320.
 Hancock county, articles on, 322.
 Hannibal shales, at Burlington, 55.
 Hardin county, articles on, 322.
 Harrison county, articles on, 322.
 Harvey section, 95.
 Haworth, Erasmus, writings, 322.
 Hayden, F. V., writings, 322.
 Heer, O. J. writings, 322.
 Helderberg (Upper), articles on, 323.
 Hematite, 191.
 Henry county, articles on, 323.
 Herrick, W. H., writings, 323.
 Hinrichs, Gustavus, writings, 323.
 Hobbs, W. H., examination of diabase, 16.
 Houser, Gilbert L., Some Lime Burning Dolmites, etc., 197.
 Work of, 4.
 Howard county, articles on, 323.
 Trenton limestone, 26.
 Hudson River shales, articles on, 323.
 Hull Well, 18, 165.
 Record, 168.
 Humboldt county, articles on, 324.
 Huntington, O. W., writings, 324.
 Hydrocarbons, 195.
 Hydrography, articles on, 324.
 Hydrous sulphates, 194.
 Hydroxides, 192.
 Ida county, articles on, 324.
 Igneous rocks, articles on, 324.
 Independence shales, 32.
 Articles on, 325.
 Inoceramus beds, 157.
 Introductory to Geological Formations of Iowa, 13.
 Iowa county, articles on, 343.
 Iowa, general, articles on, 325.
 Iowa, Geological Formations, 11.
 Iowa, table of Siluro-Cambrian formations, 23.
 Iron, 185.
 Carbonate, 195.
 Ore, 192.
 Oxide, 191.
 Sulphate, 195.
 Irregularity of Coal Measure floor, 121.
 Irving, R. D., writings, 344.
 Jackson county, articles on, 344.
 Coal Measures, 81.
 Quarries, 31.
 James, Joseph F., writings, 344.
 Jameson, C. D., work of, 4.
 Jasper county, articles on, 345.
 Paint, 192.
 Jefferson county, articles on, 345.
 Relations of Coal Measures and St. Louis Limestone, 120.
 Johnson county, articles on, 346.
 Quarries, 31.
 Jones, John H., writings, 344.
 Kaolin, 195.
 Kaskaskia limestone, 74.
 Priority of term, 77.
 Keokuk borings, 55.
 Keokuk county, articles on, 349.
 Keokuk limestone, articles on, 346.
 Keokuk section, 69.
 Keyes, Charles R., Annotated Catalogue of Minerals, 181.
 Bibliography of Iowa Geology, 209.
 Geological Formations of Iowa, 11.
 Report of, 7.
 Work referred to, 4.
 Writings, 349.
 Kinderhook beds, articles on, 358.
 Description, 50.
 Limestone, 52.
 Priority of name, 53.
 Uses, 57.
 Kossuth county, articles on, 362.
 Lakes, articles on, 362.
 Lamellibranchs, articles on, 362.
 Lansing (Allamakee county), limestone, quarried, 24.
 St. Croix sandstone, 20.

- Lava Flows in Northwestern Iowa, 163.
 Lava flow, age, 169.
 Law establishing Geological Survey referred to, 3.
 Lead, articles on, 364.
 Carbonate, 193.
 Ore, 190.
 Sulphate, 194.
 Le Claire beds, 203.
 Dolomite, analysis, 200.
 Limestone, 29.
 Lee county, articles on, 364.
 Boring at Keokuk, 55.
 Calcite, 193.
 Chalcopyrite, 191.
 Dolomite, 193.
 Keokuk section, 69.
 Millerite, 187.
 Quarries, 71.
 Quartz, 191.
 Relations of Coal Measures and St. Louis limestone, 120.
 Section of St. Louis limestone at Keokuk, 73.
 Zinc, 187.
 Le Grand section, 37.
 Leidy, Joseph, writings, 366.
 Lesley, J. P., writings, 366.
 Life during Lower Carboniferous, 63.
 Lime, articles on, 366.
 Burlington Rocks, 71.
 Devonian rocks, 40.
 Oneota limestone, 24.
 Properties, 201.
 St. Louis limestone, 74.
 Trenton limestone, 26.
 Lime burning dolomites, 197.
 Lime City, exposures, 205.
 Lime Creek, articles on, 366.
 Shales, 46.
 Limestone, Augusta, 61.
 Cedar Valley, 34.
 Coal Measures, 123.
 Galena, 26.
 Le Claire, 29.
 Lower Coal Measures, 92.
 Niagara, 29.
 Oneota, 21.
 St. Louis, 72.
 St. Louis, Distribution and Relations, 171.
 Trenton, 25.
 Upper Coal Measures, 174.
 Limonite, 192.
 Linn county, articles on, 366.
 Quarries, 31.
 List of Minerals, 184.
 Lithia Spring, 161.
 Lithology of Des Moines beds, 86.
 Lower Coal Measures, 86.
 Upper Coal Measures, 114.
 Loess, 142.
 Articles on, 367.
 Characters, 143.
 Louisa county, articles on, 370.
 Limestone, 68.
 Quarries, 71.
 Louisiana limestone, 54.
 Lower Carboniferous, 47.
 Lucas county, articles on, 370.
 Lyon county, articles on, 370.
 Sioux quartzite, 19.
 Madison county, articles on, 370.
 Magnesian limestone, articles on, 371.
 Magnesian sulphate, 195.
 Magnetite, 192.
 Mahaska county, articles on, 371.
 Geological section, 174.
 Position of coal beds, 178.
 St. Louis limestone, 171.
 Siderite, 193.
 Sketch-map, 176.
 Mammals, articles on, 371.
 Manganese oxide, 191.
 Map, geological, of Iowa, plate 1, opposite page 13.
 Interior Coal Field, opposite page 81.
 State, 9.
 Maps, list, 372.
 Maquoketa shales, 28.
 Articles on, 374.
 Marble, articles on, 374.
 Marcasite, 190.
 Marcou, Jules, writings, 375.
 Margin of Coal-field, 173.
 Marion county, articles on, 376.
 Bennington section, 96.
 Dunreath section, 96.
 Harvey section, 95.
 Pyrite, 190.
 Quarries, 74.
 Redrock quarry, 101.
 Redrock sandstone, 90.
 Redrock section, 95.
 Section at Bennington, 103.
 Marshall county, articles on, 375.
 Le Grand section, 57.
 McGee, W. J., writings, 376.
 McGregor, (Clayton County).
 Limestone quarried, 24.
 Pictured rocks, 25.
 McWorther, Tyler, writings, 379.
 Medina sandstone, articles on, 379.
 Meek, F. B., writings, 379.
 Melanterite, 195.
 Merrill, Geo. P., writings, 383.
 Metallic paint, 192.
 Meteorites, articles on, 383.
 Microscopical appearance of quartz-porphry, 167.
 Miller, S. A., writings, 384.

- Millerite, 187.
 Articles on, 384.
 Mills county, articles on, 387.
 Mineral coal, 196.
 Mineral oil, 195.
 Minerals, articles on, 385.
 Catalogue, 181.
 List, 184.
 Mining, articles on, 386.
 Minnesota, Geological Survey, 15.
 Table of Siluro-Cambrian formations, 23.
 Mississippi section, 50.
 Mississippian series, 47.
 Classification of, 50.
 Missouri formation, 85, 86, 114.
 Mitchell county, articles on, 387.
 Monona county, articles on, 388.
 Monroe county, alum, 195.
 Articles on, 388.
 Montgomery county, articles on, 388.
 Montpelier sandstone, 40.
 Muscatine county, articles on, 388.
 Sandstone, 40.
 Natural Gas, articles on, 389.
 Newberry, J. S., writings, 389.
 Niagara, articles on, 390.
 Building stones, 197.
 Limestone, 29, 201.
 Nickel ore, Millerite, 188.
 Nicolle, J. N., writings, 391.
 Niles, W. H., writings, 391.
 Niobrara chalk, 158.
 Formation, 57.
 Nishnabotna sandstone, 134.
 Articles on, 391.
 Nitrates, 192.
 Nitre, 192.
 North Riverside section, 153.
 Norwood, J. G., writings, 391.
 Nuttall, Thomas, writings, 394.
 O'Brien county, articles on, 394.
 Oil, mineral, 195.
 Onocota limestone, 21.
 Articles on, 398.
 Correlation, 23.
 Its names, 22.
 Thickness, 21.
 Onondaga-Salt group, articles on, 398.
 Ophiurids, articles on, 308.
 Osage, usage of the terms, 60.
 Osborn, Herbert, writings, 398.
 Osceola county, articles on, 398.
 Oscillation of Carboniferous shore line, 118.
 Outliers, Cretaceous, 125.
 Owen, D. D., writings, 399.
 Oxides, 191.
 Page county, articles on, 401.
 Paint, metallic, 192.
 Mineral, articles on, 401.
 Palo Alto county, articles on, 402.
 Cretaceous deposits, 126.
 Papers prepared by C. R. Keyes, 9.
 Parvin, T. S., writings, 402.
 Patrick, G. E., analysis of glass-sand, 225.
 Peats, articles on, 402.
 Pennsylvanian series, 80.
 Petroleum, 195.
 Articles on, 402.
 Physical Geography, articles on, 402.
 Pictured rocks, Clayton county, 25.
 Plants, articles on, 403.
 Coal Measures, 88.
 Remains in sandstone, 91.
 Plaster of Paris, at Ft. Dodge, 137.
 Plesiosaurus, in Cretaceous, 156.
 Plymouth county, articles on, 403.
 Cretaceous deposits, 126, 145.
 Extent of clay, 159.
 Pocahontas county, articles on, 403.
 Polk county, articles on, 405.
 Bluffs of sandstone, 91.
 Des Moines section, 97.
 Commerce section, 97.
 Preglacial channel, 113.
 Pyrite, 188.
 Terrace Hill section, 111.
 Polyzoans, articles on, 405.
 Porphyry quartz, 165.
 Age of, 169.
 Characters, 166.
 Microscopical characters, 166.
 "Potsdam" sandstone, 20.
 Articles on, 405.
 Pottawattamie county, articles on, 405.
 Poweshiek county, articles on, 406.
 Pottery clay, articles on, 405.
 Prairies, articles on, 406.
 Pratt, W. H., writings, 406.
 Pratten, Henry, writings, 407.
 Properties of Upper Silurian rocks, 31.
 Protozoans, articles on, 407.
 Prout, A. H., writings, 407.
 Pyrite, 188.
 Articles on, 408.
 Quarries, articles on, 408.
 Des Moines county, 71.
 Cedar county, 31.
 Clinton county, 31.
 Coal Measures, 123.
 Lee county, 71.
 Louisa county, 71.
 Marion county, 74.
 Nishnabotna, 135.
 Quartzite, Sioux, 19.
 Redrock, 101.
 Sandstone, St. Croix, 20.

- Scott county, 31.
 St. Louis, 74.
 Trenton limestone, 26.
 Upper Silurian, 29.
 Van Buren county, 71, 74.
 Wapello county, 74.
 Quartz, 191.
 Quartzite, Sioux, 15.
 Quartz-porphry, age of, 17.
 Northwestern Iowa, 165.
 Sioux county, 18.
 Thin section, 167.
 Quaternary, articles on, 408.
 Redrock, bluff section, opposite page 95.
 Exposure, opposite page 95.
 Quarry, 101.
 Sandstone, 89.
 Section, 95.
 Relations of St. Louis limestone, 171.
 Reports, Administrative, 1.
 First Annual of State Geologist, 3.
 Keyes, C. R., 7.
 Ringgold county, articles on, 417.
 Rivers, articles on, 418.
 Road materials, articles on, 418.
 Rockford shales, articles on, 418.
 Rock Rapids (Lyon county), quartzite, 19.
 Rocks, articles on analyses, 418.
 Rutile, 192.
 Sac county, articles on, 418.
 Salisbury, R. D., writings, 419.
 Saltpetre, 192.
 Sand, articles on, 419.
 Glass, in Allamakee county, 20.
 Glass, in Clayton county, 25.
 Sandstones, articles on, 419.
 Cambrian, 20.
 Carboniferous in Muscatine county, 44.
 Coal Measures, 88, 123.
 Montpelier, 40.
 Nishnabotna, 134.
 "Potsdam," 20.
 Redrock, 89.
 St. Croix, 22.
 St. Peter, 24.
 Upper Coal Measures, 115.
 Sardeson, F. W., writings, 419.
 Sargent Bluff section, 151.
 Saurians, in Cretaceous, 156.
 Scott county, articles on, 419.
 Building-stones, 199.
 Lime, 201.
 Quarries, 31.
 Section at Bennington, 96, 103.
 Big Sioux, 127.
 Burlington-Keokuk, 58.
 Central Iowa, opposite page 93.
 Coal Measures generalized, 105.
 Coal Measures, showing arrangement of coal beds, 112.
 Coal Measures on St. Louis limestone, opposite page 120.
 Coalport, 95.
 Commerce, 97.
 Composite section of Coal Measures, 105.
 Des Moines, 91.
 Des Moines (general), 97.
 Des Moines, showing preglacial channel in coal, 113.
 Desoto, 98.
 Dunreath, 96.
 Elk Cliff, opposite 95.
 Ford Bluff, 97.
 Fort Dodge, 95.
 General, of Carboniferous, 117.
 General, geological of Iowa, opposite 14.
 Geological, in Mahaska county, 174.
 Gypsum deposits at Ft. Dodge, 136.
 Harvey, 95.
 Keokuk, 69.
 Le Grand, 57.
 Niobrara beds, 158.
 North Riverside, 153.
 Quartz-porphry, thin, 167.
 Redrock, 95.
 Relation of Upper and Lower Coal Measures, 118.
 Sargent Bluffs, 151.
 St. Louis and Keokuk limestones, 73.
 Terrace Hill, Des Moines, 111.
 Van Meter, 98.
 Shales, kinds in Coal Measures, 87.
 Shelby county, articles on, 421.
 Sheppard, C. U., writings, 421.
 Shimek, B., writings, 421.
 Shore-line, Carboniferous, changes, 119.
 Carboniferous, oscillations, 118.
 Shumard, B. F., writings, 422.
 Siderite, 193.
 Silicates, 195.
 Silurian, 21.
 Articles on, 422.
 Upper, properties of rocks, 31.
 Quarries, 31.
 Silver, 186.
 Sioux City clays, 160.
 Cretaceous, 160.
 Deposits, 129.
 Three divisions of Cretaceous, 131.
 Sioux county, articles on, 424.
 Eruptive rocks, 18.
 Hull well, 18, 165.
 Record of Hull well, 168.
 Sioux quartzite, 15.
 Articles on, 424.
 Sketch-map of interior coal field, opposite page 81.

- Mahaska county, 176.
 Smith, J. A., writings, 425.
 Smithsonite, 193.
 Soil, 8.
 Articles on, 425.
 Sphalerite, 186.
 Sponges, articles on, 426.
 Spring, Lithia, 161.
 Springer, Frank, writings, 426.
 Springs, articles on, 426.
 State Geologist, First Annual Report, 3.
 Work of, 4.
 St. Croix sandstone, 20.
 Thickness, 20.
 St. John, O. H., writings, 427.
 St. Louis limestone, 72.
 Articles on, 429.
 Exposures in Mahaska county, 175.
 Mahaska county, 171.
 Unconformity of coal, 107.
 Story county, articles on, 431.
 Stout, J. A., writings, 431.
 St. Peter sandstone, 24.
 Articles on, 432.
 Stratigraphy of Lower Coal Measures, 93.
 Upper Coal Measures, 115.
 Structure of Iowa Coal Measures, 116.
 Lower Coal Measures, 93.
 Stucco manufactures, 137.
 Subcarboniferous, 49.
 Subdivisions of Coal Measures, 83.
 Sulphates, 194.
 Sulphides, 186.
 Sulpho-salts, 191.
 Sulphur, 184.
 Surface deposits, 138.
 Surface features, articles on, 432.

 Tama county, articles on, 433.
 Taylor county, articles on, 433.
 Terra cotta clays, 154.
 Thickness of Lower Coal Measures, 109.
 Tiffany, A. S., writings, 433.
 Tilted beds, 29.
 Tilton, J. L., writings, 433.
 Todd, J. E., 434.
 Topography, articles on, 435.
 Of coal region, 82.
 Torrey, Joseph, writings, 436.
 Trenton limestone, 25.
 Articles on, 436.
 Trilobites, articles on, 436.

 Ulrich, E. O., writings, 437.
 Unconformity in Coal Measures, 108.
 Between Coal Measures and St. Louis limestone, 107.
 Union county, articles on, 437.
 Upper Coal Measures, 114.
 Upper Silurian, articles on, 29.
 Uses of rocks, 30.

 Van Buren county, articles on, 437.
 Quarries, 71, 74.
 Van Meter section, 98.
 Variability of Coal Measure strata, 107.
 Verneuil, Ed. de, writings, 437.
 Vertebrates, articles on, 438.

 Wad, 191.
 Wachsmuth, Charles, writings, 439.
 Walcott, C. D., writings, 440.
 Wallace, S. J., writings, 440.
 Wapello county, articles on, 440.
 Quarries, 74.
 Ward, Lester F., writings, 441.
 Warren county, articles on, 441.
 Ford section, 97.
 Warsaw beds, 69.
 Limestone, articles on, 441.
 Washington county, articles on, 441.
 Waters, articles on, 442.
 Waukon (Allamakee county), limestone quarried, 24.
 Wayne county, articles on, 442.
 Webster county, articles on, 442.
 Celestite, 194.
 Coal and St. Louis limestone, 90.
 Dolomite, 193.
 Gypsum, 194.
 Gypsum beds, 135.
 Webster, Clement L., writings, 442.
 Wells, articles on, 444.
 At Hull, 168.
 Deep, in N. W. Iowa, 17.
 White, Charles A., writings, 444.
 Whitfield, R. P., writings, 454.
 Whitney, J. D., writings, 454.
 Williams, Albert, Jr., writings, 455.
 Williams, H. S., writings, 455.
 Wilson, Park C., writings, 456.
 Winchell, Alexander, writings, 456.
 Winchell, N. H., writings, 457.
 Winnebago county, articles on, 457.
 Winneshiek county, articles on, 458.
 Trenton limestone, 26.
 Wisconsin, table of Siluro-Cambrian formations, 23.
 Witter, F. M., writings, 458.
 Woodbury county, articles on, 458.
 Building stones, 138, 158.
 Cretaceous deposits, 145.
 Extent of clay deposits, 159.
 Granite, 138.
 Shales, 137, 149.
 Worth county, articles on, 459.
 Worthen, A. H., writings, 459.
 Wright county, articles on, 464.

 Zinc, articles on, 464.
 Blend, 187.
 Carbonate, 193.
 Silicate, 195.
 Zittel, Karl A., writings, 464.

